

## CHAPTER I

# Historical and Developmental Patterns of Alcohol and Drug Use among College Students

## *Framing the Problem*

John E. Schulenberg and Megan E. Patrick

How do we best frame the problem of college student alcohol and drug use? Is it a problem that has been getting worse or better in recent years? Have the historical changes been specific to college students or more generally true of all in the 18- to 22-year-old age group? Indeed, is it more productive to view age 18–22 substance use as a college-specific issue or more of a time-of-life issue? What are the developmental trajectories of alcohol and drug use across the college years? How do these trajectories vary for those who drop out of, or never enroll in, college? And do the trajectories matter in terms of psychosocial adjustment? In this chapter, we consider these “big picture” questions, providing empirical evidence based on national multicohort panel data from the Monitoring the Future (MTF) study (Johnston, O’Malley, Bachman, & Schulenberg, 2010) to frame college student substance use both historically and developmentally.

We begin by providing an overview of historical variations, considering trends in several indices of substance use across three decades (1980–2009) as a function of college student status among national samples of young people 1 to 4 years post-high school. Then, after considering the developmental context that surrounds college transitions,

we examine developmental trends in the two most common substances of abuse—alcohol and marijuana—from the senior year of high school through age 25 as a function of college status and of dropping out of college. Next, we examine different developmental trajectories of frequent heavy drinking (i.e., binge drinking), with particular attention given to college students who were not binge drinkers in high school. In the final section, we discuss theoretical and practical implications.

### **HISTORICAL TRENDS IN COLLEGE STUDENT AND NON-COLLEGE PEER SUBSTANCE USE, 1980–2009**

One truism regarding the epidemiology of substance use is that indices are best thought of as moving targets across historical time. Rarely does a substance use index stay steady across multiple years (Johnston et al., 2010), making it important to know the years of assessment to place substance use within the broader historical context. In describing historical trends, we can conceptualize three types (Schulenberg, Bachman, Johnston, & O'Malley, 1995): (1) cyclical change, represented as a wave-like function (e.g., shifts between political conservatism and liberalism); (2) unidirectional change, represented as a linear function (e.g., the place of computers in our lives); and (3) no change, represented as a constant function (e.g., the desire of parents to give their children a better life). Of course, given sufficient time, it is possible that unidirectional and no-change trends are eventually realized as cyclical change.

Reasons for historical variation in substance use are multiple and complex, relating to drug supply and demand, which are cast in broader cultural, political, and societal trends. Much of what we have seen in substance use over the past half century has been cyclical trends (Johnston et al., 2010). To help explain such cyclical trends, one important consideration is what Johnston (1991) terms “generational forgetting,” whereby the dangers of a given drug take center stage for many years, resulting in a decline in use of the drug, followed by a reduction in preventive attention paid to the drug, resulting in a subsequent increase in use. In regard to linear historical trends in drug use, mechanisms pertain to the slow but constant amassing of evidence indicating the dangers (or lack of dangers). The rarity of constant historical trends suggests countervailing forces that oppose the mechanisms of historical change. One leading edge of historical trends in substance use relates to attitudes about the dangers of the given drug, which have shown remarkable prognostic power regarding use of the given drug (e.g., Johnston et al., 2010).

Any consideration of historical variation must contend with possible age-related, cohort (i.e., history-graded), and period (i.e., secular trend)

effects. Because we hold age constant (ages 19–22) in this section, we do not attend to age-related changes, and we cannot disentangle cohort and period effects. The historical trends we show could be due to lasting individual differences dependent on one's birth cohort, or to more generalized social-cultural effects experienced by all regardless of cohort. Because our emphasis is descriptive, we do not delve into determining cohort versus period effects (for more on such distinctions, see Johnston et al., 2010).

### **Monitoring the Future (MTF) Study Data**

Data for this chapter come from the MTF study, an ongoing study of adolescents and adults (Johnston et al., 2010). MTF was initiated in 1975 with the primary purpose of understanding the epidemiology and etiology of substance use among American youth. Two design components of the larger project are important for results shown in this chapter: (1) nationally representative samples of high school seniors are surveyed each year; and (2) a subset of individuals is randomly selected for biennial follow-up into adulthood. We briefly summarize MTF design and procedures (for more details, see Bachman, Wadsworth, O'Malley, Johnston, & Schulenberg, 1997; Johnston et al., 2010; Schulenberg, Wadsworth, O'Malley, Bachman, & Johnston, 1996; Schulenberg et al., 2005).

Each year, approximately 17,000 high school seniors in approximately 135 public and private high schools representative of the 48 coterminous states participate in the MTF survey. Self-administered questionnaires are given each spring during school hours. Beginning with the class of 1976, approximately 2,400 respondents have been randomly selected for biennial follow-up from each cohort through mail surveys. One random half of each cohort is surveyed 1 year after high school (modal age 19) and the other random half is surveyed 2 years after high school (modal age 20); each half is followed biennially thereafter. The sample retention rates between wave 1 (age 18) and waves 3 (ages 21–22) and 4 (ages 23–24) (age coverage of primary interest in this chapter) have been between 60% and 70% (which is quite favorable given that MTF is a low-cost national survey study, rather than a more in-depth smaller-scale interview study, which typically gets better retention rates). Previous MTF attrition analyses have shown that, compared with those lost to follow-up, those retained are more likely to be female and white, to have higher parent education levels and GPAs, and to have lower levels of senior-year truancy and substance use (Schulenberg et al., 1996, 2005).

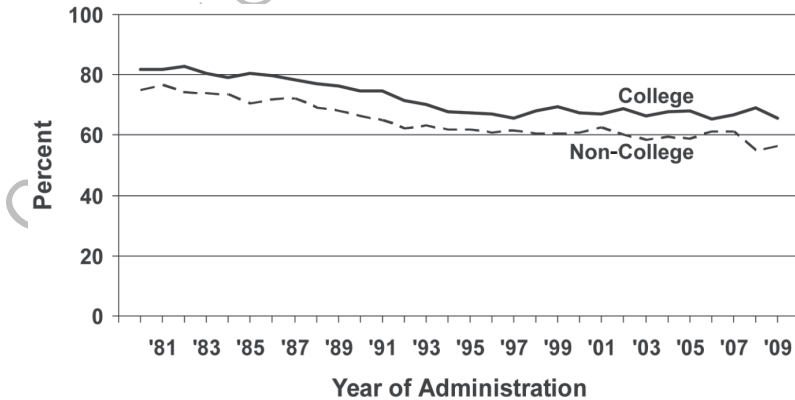
Our emphasis in this section is on the historical variation across three decades (1980–2009) in prevalence rates for four substance use indices as

a function of college student status, defined as being enrolled full-time in March of the given year in a 2- or 4-year college at wave 2 (modal ages 19–20) or wave 3 (modal ages 21–22). Thus, the college student group includes those ages 19–22 enrolled full-time; the non-college comparison group includes those ages 19–22 engaged in other pursuits. Between 1980 and 2009, sample sizes per year ranged from 1,000 to 1,500 for college students and 800 to 1,300 for non-college peers. Substance use prevalence rates were based on two indices of occasions of alcohol use (past 30-day use, past 2-week binge drinking) and two indices of occasions of illicit drug use (12-month marijuana use, 12-month illicit drug use other than marijuana) (see Johnston et al., 2010, for details about these measures).

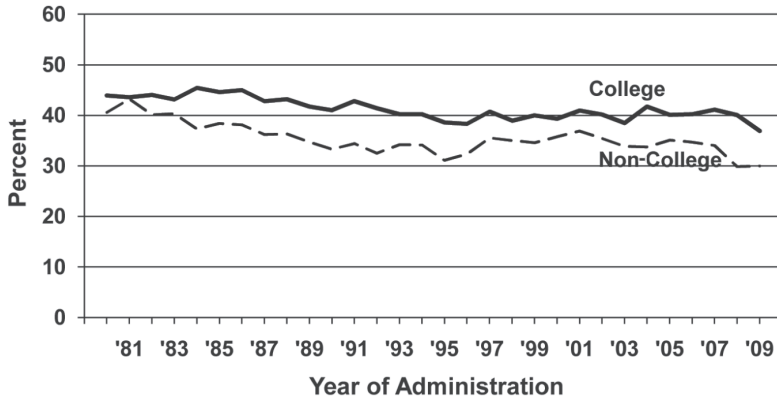
### Historical Trends in Alcohol Use

As shown in Figure 1.1a, 30-day alcohol use has shown mostly linear decline across the past three decades, with most change occurring from the early 1980s to the mid-1990s. As is clear, rates have been consistently higher by about 5 percentage points for college students than for non-college youth. For college students, rates went from 81% in 1980 to 64% in 2009; for non-college youth, rates went from 76% in 1980 to 58% in 2009. In general, 30-day alcohol use has been more frequent among young men than young women, but in recent years, rates have not always differed by gender (see Johnston et al., 2010).

A similar historical trend is revealed for binge drinking, as shown in



**FIGURE 1.1a.** Historical trends in 30-day prevalence of alcohol use: College students versus non-college youth (ages 19–22).



**FIGURE 1.1b.** Historical trends in 2-week prevalence of binge drinking: College students versus non-college youth (ages 19–22).

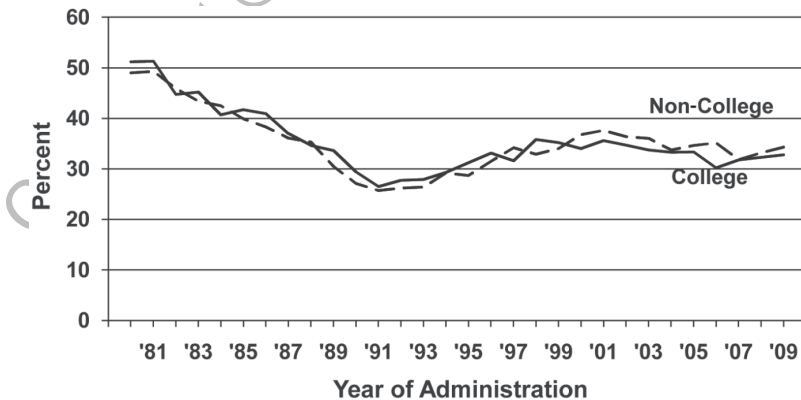
Figure 1.1b. Rates have dropped for both college and non-college youth with most of the decline occurring from the early 1980s to the mid-1990s. Rates have been consistently higher for college students than non-college youth by an average of 5 to 6 percentage points. The decline has not been large, however, especially for college students: their rates went from 42% in 1980 to 37% in 2009; for non-college youth, rates went from 40% in 1980 to 30% in 2009. Indeed, despite the slight decline in binge drinking for college students, the rate has been 40% plus/minus 2 percentage points for the past three decades. Gender differences have been consistent, with rates being 15 to 20 percentage points higher for young men than for young women. (This difference would be smaller if we defined binge drinking as four-plus drinks for women [Wechsler, Dowdall, Dav-enport, & Rimm, 1995]).

Thus, it is clear that alcohol use has been consistently higher for college students than for non-college youth over the past three decades. This pattern is due to numerous causes, including the fact that full-time college enrollment typically involves living away from parents and with like-minded peers (Bachman et al., 1997), as well as being immersed in a culture of excessive drinking, which is common at many colleges (Schulenberg & Maggs, 2002). The modest historical decline in alcohol use is consistent with the general population decline in alcohol use, making this more of a secular trend than a cohort effect (Johnston et al., 2010). It is noteworthy that binge drinking among college students has changed little across the past three decades, hovering around 40%.

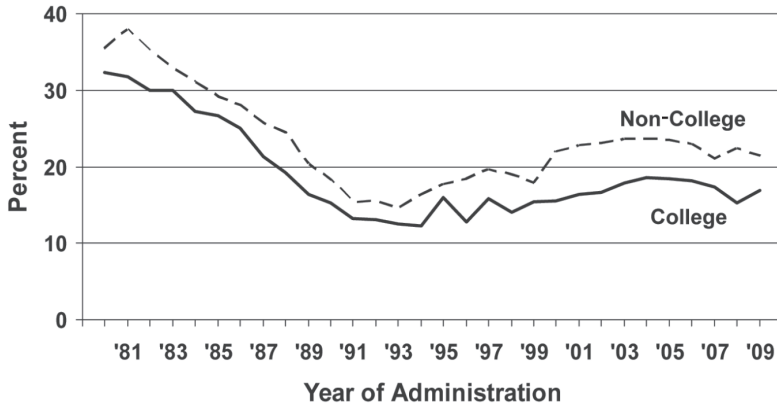
### Historical Trends in Illicit Drug Use

In contrast to the largely linear and modest declines in alcohol use, the historical change in 12-month marijuana use has been cyclical and extensive as shown in Figure 1.1c. In addition, rates have not differed consistently between college students and non-college youth. For both groups, rates dropped linearly and rapidly (by about 50%) from the early 1980s through the early 1990s, increased modestly until the late 1990s–early 2000s, and decreased inconsistently since then. Between 1980 and 2009, rates of 12-month marijuana use declined from 51% to 33% for college students, and from 49% to 34% for non-college youth. As for gender differences, prevalence rates of 12-month marijuana use have consistently been higher for men than for women, with the difference being 3 to 8 percentage points (Johnston et al., 2010).

Historical trends in use of illicit drugs other than marijuana (OTM) are shown in Figure 1.1d. The cyclical trends are consistent with those found for marijuana use, but OTM rates have been consistently lower by 3 to 5 percentage points for college students than for non-college youth. For both groups, OTM rates dropped by about 60% between the early 1980s and early 1990s, then increased inconsistently into the mid-2000s, and have declined inconsistently since then. Between 1980 and 2009 there was an overall decline from 32% to 17% for college students, and from 36% to 21% for non-college youth. Young men have shown consistently higher rates of OTM use than young women (3 to 8 percentage point differences).



**FIGURE 1.1c.** Historical trends in annual prevalence of marijuana use: College students versus non-college youth (ages 19–22).



**FIGURE 1.1d.** Historical trends in annual prevalence of use of any illicit drug other than marijuana: College students versus non-college youth (ages 19–22).

Thus, for illicit drug use, historical trends have shown uneven cyclical trends. The cycles of decline and increase are consistent with Johnston's (1991) notion of generational forgetting discussed earlier. The fact that annual prevalence of marijuana use has been similar for college students and non-college youth suggests that such use is more of an age-of-life matter rather than a college status one. However, as we see below, when considering developmental trends, 30-day marijuana use is more common among those not in college. The annual prevalence of OTM illicit drugs has been consistently higher for non-college youth. Annual marijuana use can be viewed as not particularly deviant or unconventional, but the same is not true for OTM illicit drugs (or for frequent marijuana use), suggesting that, on average, those who attend college are less deviant than non-college youth. Importantly, differences between college students and non-college youth have not changed in any systematic fashion over the past three decades.

### COLLEGE AND DEVELOPMENTAL TRENDS IN SUBSTANCE USE

The pursuit of postsecondary education can be a transformative experience. College attendance, particularly if full-time and residential, propels young people into new and unique social contexts variously focused on academic and social activities (Carter, Brandon, & Goldman, 2010; Patrick, Schulenberg, Maggs, & Maslowsky, in press; Schulenberg &

Maggs, 2002). Although more self-direction is required than in high school, college prolongs the availability of innumerable institutional supportive structures for students. These same structures, however, are generally unavailable to those not enrolled. Students are surrounded with age-mates, motivated by cultural beliefs extolling the college years as a time of exploration and experimentation, and buffered by environments relatively tolerant to youthful infractions (Maggs, 1997; Schulenberg & Maggs, 2002). Given these conditions, it is perhaps unsurprising that college students show increased rates of heavy drinking (Johnston et al., 2010). As the college experience ends, and young people make transitions into full-time work and typically more serious romantic relationships, substance use tends to subside (e.g., Bachman et al., 1997; Leonard & Homish, 2005; Staff et al., 2010; White, Labouvie, & Papadaratsakis, 2005), though clearly not for all.

Changes in substance use typically co-vary with changes in the individual and surrounding contexts, making it important to view age-related changes in substance use vis-à-vis other developmental changes. Developmental transitions include major transformations in individuals, in their contexts, and in the relations between individuals and their contexts across the life course (Schulenberg & Maggs, 2002). They often are viewed globally as the connections between major life periods (e.g., transition to adolescence, transition to adulthood), and include a series of specific changes that are internally based (e.g., biological, cognitive) and externally based (e.g., starting college, getting married) (Rutter, 1996). The period between the end of high school and the beginning of full adulthood constitutes the most potentially dynamic decade in the life span in terms of internally based and especially socially based transitions (Arnett, 2000; Patrick et al., 2010; Schulenberg & Maggs, 2002; Shanahan, 2000).

Issues of continuity and discontinuity are central to understanding the power of major developmental transitions. Transitions can contribute to discontinuity in ongoing trajectories of substance use in several ways, such as by overwhelming coping capacities, by changing the person-context match, or by increasing vulnerability to chance events (Schulenberg & Maggs, 2002). By providing “shocks to the system,” transitions serve as proximal effects that can counteract developmentally distal (e.g., childhood) effects. The result of such shocks can range from turning points to developmental disturbances (Schulenberg & Zarrett, 2006). Turning points are represented by long-term changes in the course of ongoing trajectories (Rutter, 1996). For example, the transition into marriage relates to declines in substance use, even among those who were heavily involved in alcohol and other drug use (Bachman et al., 1997; Bartholow, Sher, & Krull, 2003).

Developmental disturbances, in contrast, are momentary perturba-



tions followed by resumption of the prior ongoing trajectory (Schulenberg & Zarrett, 2006). In such cases, transitions may simply result in some normative short-term deviance—such as excessive drinking—that is neither predictable in advance nor predictive of future functioning. Of course, despite major life transitions, important contexts sometimes change little. In particular, if one does not leave the parental home after high school and thus maintains similar relationships (good or bad) with family members and peers, then the person–context match (or mismatch) may be maintained across the transition, contributing to some continuity in substance use trajectories (Bachman et al., 1997; Staff et al., 2010; White, Fleming, Kim, Catalano, & McMorris, 2008).

An important non-normative transition embedded within the college experience is dropping out or leaving without a degree. In the United States, one out of every four college freshmen fails to return for a second year, and only 56% of students seeking a bachelor's degree are successful in doing so within 6 years (National Center for Education Statistics, 2010). The association between substance use and dropping out of college is not a clear or consistent one. Although there is some evidence that binge drinking is positively associated with dropping out of college (Jennison, 2004; Perkins, 2002), the evidence about causal connections is mixed (Williams, Powell, & Wechsler, 2002). We suspect that part of the complexity here is that binge drinking can reflect peer bonding and engagement in the college experience, if not the academic part of the experience (Maggs, 1997).

## Questions and Data

We examine developmental trends in binge drinking and 30-day marijuana use as a function of college student status and gender. Alcohol and marijuana use are the most common psychoactive substances, and binge drinking during a 2-week period and marijuana use during a 30-day period reflect relatively serious involvement compared to more experimental use. We also show how dropping out relates to substance use trajectories.

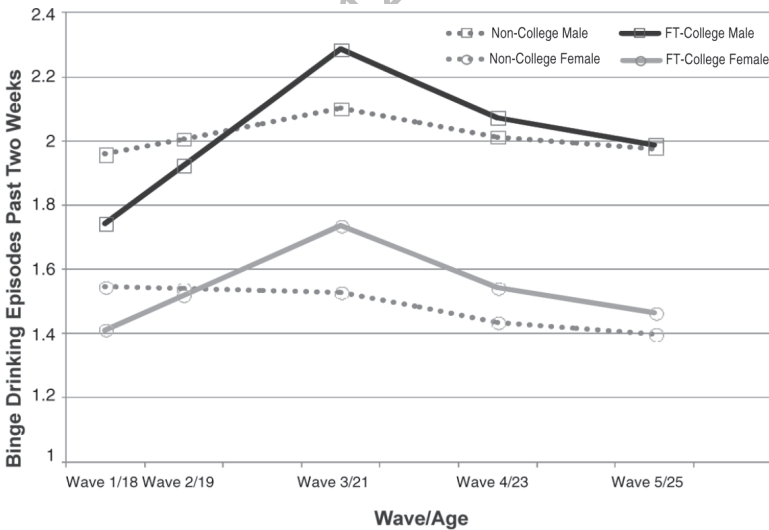
We draw from the MTF national panel data described earlier, following young people from senior year in high school (age 18) to age 25 (senior-year cohorts 1976–2000). We limit analyses to the half sample that was surveyed a year after high school (modal age 19), then biennially at modal ages 21, 23, and 25. This allows us to examine the freshman year transition and to consider dropouts between the first and third years of college. College students here are defined as being enrolled full-time in a 4-year college at wave 2 (modal age 19; weighted  $N \approx 6,000$  college students,  $N \approx 8,000$  non-college youth). College dropouts were enrolled

full-time in a 4-year college at wave 2 and then not enrolled full-time in a 4-year college at any of the subsequent waves ( $N \approx 600$ ); college stay-ins were enrolled full-time in a 4-year college at waves 2 and 3 ( $N \approx 4,400$ ); we excluded other small subgroups such as stop-outs.

To test the parameters of the trajectories, we use piece-wise latent growth modeling to represent the five waves of observed data as three latent variables: an intercept (age 18 level), slope 1 (describing the direction and rate of change across ages 18 to 21), and slope 2 (direction and rate of change across ages 21 to 25). This allows us to divide the overall age 19–25 trajectories into two meaningful slopes, with the break (age 21) co-occurring with the typical peak in binge drinking (Patrick & Schulenberg, 2011). We use multigroup modeling to determine whether subgroup differences in intercepts and slopes are significant. We illustrate findings in terms of observed means to describe the average trajectories and note subgroup differences.

### Developmental Trajectories by College Student Status and Gender

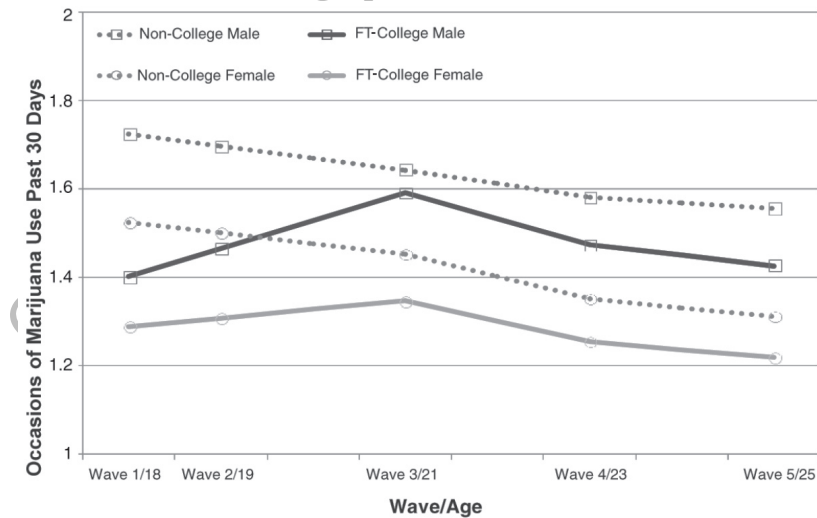
As shown in Figure 1.2a, when in the senior year of high school, those who are college bound have lower levels of binge drinking than those



**FIGURE 1.2a.** Developmental trends in binge drinking: Full-time college students versus non-college youth by gender.

who are not college bound (for males and females, the intercept is significantly lower for youth who will attend college). Then, college students quickly escalate to surpass non-college youth in rates of binge drinking by age 21 (slope 1 is increasing and is significantly greater for college students). From ages 21 to 25, college students decrease their binge drinking at a faster rate than do non-college youth (slope 2 is decreasing and is significantly greater for college students). By age 25, there is no significant difference in level of binge drinking as a function of previous college status. Thus, the pattern of steep escalation and decline from senior year in high school through the mid-20s is far more distinctive of full-time college students (consistent with White et al., 2005), providing support for characterizing the college experience, for many, as immersion in a culture of heavy drinking (Schulenberg & Maggs, 2002). These developmental trends and group differences have not varied historically.

This distinctive escalation–decline pattern for college students is also evident for 30-day marijuana use, as illustrated in Figure 1.2b. At senior year of high school (age 18), college-bound students have significantly lower levels of marijuana use than those not college bound. Then, between ages 18 and 21, marijuana use increases for college students and declines for non-college youth (slope 1 is significant for all groups, positive for college students and negative for non-college youth). Marijuana

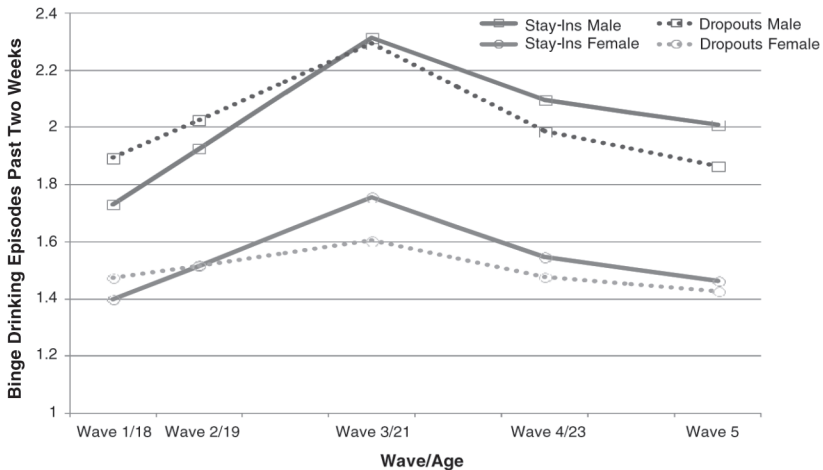


**FIGURE 1.2b.** Developmental trends in 30-day marijuana use: Full-time college students versus non-college youth by gender.

use peaks at age 21 for college students and at age 18 for non-college youth. Between ages 21 and 25, marijuana use declines for all groups (slope 2 is significant and negative for all groups); for males, the rate of decline is faster for college than non-college (slope 2 is significantly greater for college males); for females, the rate of decline is similar for college and non-college. Thus, as is true for binge drinking, the trajectory of 30-day marijuana use for college students is characterized as quick escalation out of high school, a peak at age 21, and then a decline to age 25. However, at all ages, marijuana use is higher for non-college youth. These differences and developmental trends have not varied historically.

### Developmental Trajectories by College Dropout Status and Gender

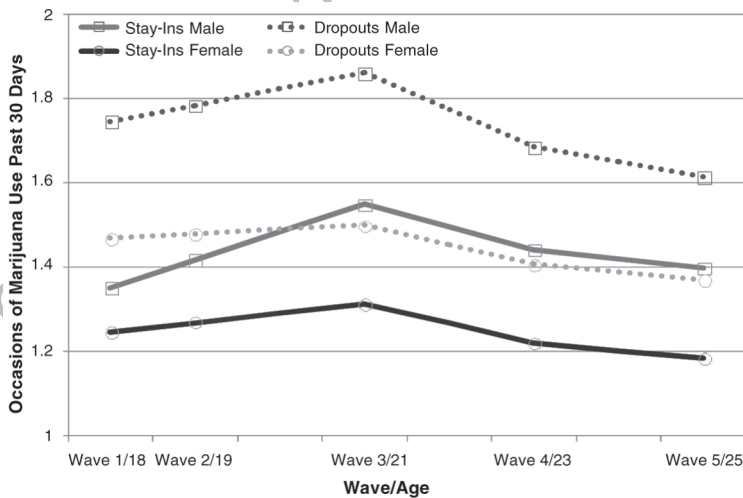
We next turn to considering how dropping out of college relates to substance use trajectories. As shown in Figure 1.2c, as seniors in high school, those who eventually drop out have higher rates of binge drinking (significant only for males). Those who dropped out of college (between ages 19 and 21) had significantly *slower* rates of increase than did those who stayed in college during this period; this was true for males and females. That is, *a more rapid increase in binge drinking across the first few years of college was related to staying in, not dropping out of, college*, suggest-



**FIGURE 1.2c.** Developmental trends in binge drinking: Full-time college student stay-ins versus dropouts by gender.

ing the possible prosocial and peer bonding correlates of binge drinking in college (Maggs, 1997). At age 21, when dropping out had already occurred, stay-in and dropout males had the same level of binge drinking; and then between ages 21 and 25, the level of binge drinking for dropouts declined significantly faster than that for stay-ins. In contrast, for females, stay-ins had a significantly higher level of binge drinking at age 21 and a significantly faster decline between ages 21 and 25 than dropouts. Thus, dropping out of college related to subsequently lower binge drinking, sooner for females and later for males. These differences and developmental trends have not varied historically.

The story is somewhat similar for marijuana use. As shown in Figure 1.2d, those who eventually dropped out of college had higher rates of 30-day marijuana use at age 18. In fact, across the entire age period from 18 to 25, college dropouts had significantly higher rates of marijuana use than stay-ins. For males, dropouts had a significantly slower rate of increase between ages 18 and 21 and a significantly faster rate of decrease between ages 21 and 25 compared to stay-ins. For females, however, there were no differences in the slopes. Thus, only for males' marijuana use do we see the characteristic pattern found for binge drinking: higher intercept, slower positive slope 1, and steeper negative slope 2 for college dropouts compared to stay-ins. These differences and developmental trends have not varied historically.



**FIGURE 1.2d.** Developmental trends in 30-day marijuana use: Full-time college student stay-ins versus dropout by gender.

## COLLEGE AND DIFFERENT DEVELOPMENTAL TRAJECTORIES OF BINGE DRINKING

Building on the findings above, an important question is the extent to which the normative trajectories apply to all. More generally, the question pertains to the heterogeneity of individual trajectories of binge drinking embedded within the total sample. Over the past two decades, developmental science and the study of addictions have recognized the advantages of examining both total sample and individual-level longitudinal trajectories (e.g., Jackson, Sher, & Schulenberg, 2008; Schulenberg & Maggs, 2002; Zucker, 2006).

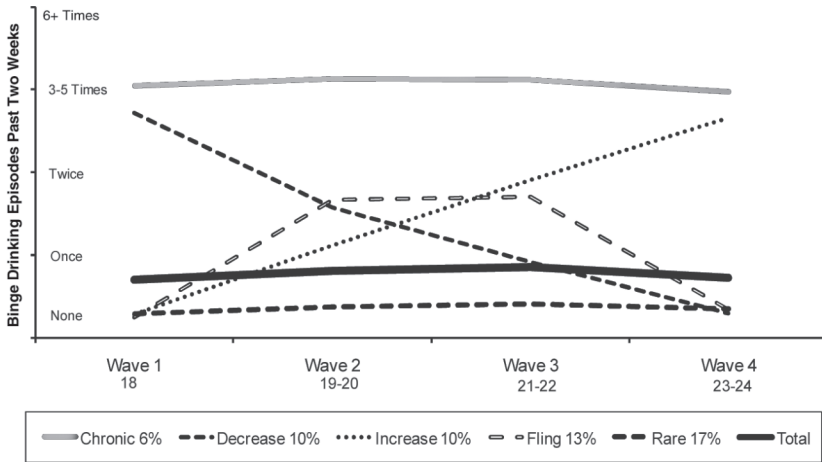
### Questions and Data

In this section, we deconstruct the total sample binge-drinking trajectory described in the previous section, identifying the different embedded developmental trajectory groups. We consider how prevalence of the different binge-drinking trajectory groups varies by college status and college characteristics. We give special attention to college students who were not binge drinkers in high school to see how their trajectories unfold across the college years, attending to psychosocial predictors, correlates, and adulthood outcomes.

MTF national panel data, described extensively above, are used. For the most part, we include four waves of panel data, following young people from senior year of high school through age 24. This time, we use both random halves of each cohort that are followed up (one half starting at age 19 and the other half at age 20, and both followed up biennially thereafter) and combine the two halves such that wave 2 covers modal ages 19–20, wave 3 covers modal ages 21–22, and wave 4 covers modal ages 23–24. We include 23 senior-year cohorts 1976–1998, with weighted  $N \approx 20,000$ . For the long-term follow-up analyses we include panel data up through modal ages 29–30 (cohorts 1976–1995;  $N \approx 16,000$ ).

### Binge Drinking Trajectory Groups

We have been working with binge drinking (and marijuana use) trajectories for many years, first constructing them with cluster analysis and conceptual groupings followed by growth mixture modeling (e.g., Schulenberg & Maggs, 2002; Schulenberg et al., 1996, 2005). We have consistently found six distinct binge-drinking trajectory groups, as illustrated in Figure 1.3. Clearly, hidden within the total sample trajectory are several distinct longitudinal patterns. The Chronic group, representing 6% of the population (11% of men, 2% of women), had consistently high levels



**FIGURE 1.3.** Developmental trajectories of binge drinking: Mean scores by trajectory group. Adapted from Schulenberg and Maggs (2002). Copyright 2002 by Alcohol Research Documentation, Inc., Rutgers Center of Alcohol Studies, Piscataway, NJ, 08854. Adapted by permission.

of binge drinking between ages 18 and 24, averaging 3–5 binge-drinking episodes per 2-week period. The Decreased group (10% of the population; 11% men, 9% women), had a high level of binge drinking at age 18 (almost as high as the Chronic group), and then dropped consistently across the years to be at a very low level by ages 23–24. Three trajectory groups—Increased, Fling, and Rare—had the same initial level of binge drinking, an average of 0.25 episodes per 2-week period. The Increased group (10% of the population; 14% men, 7% women) showed steadily increasing binge drinking over time, escalating almost to the Chronic group level by ages 23–24. The Fling group (13% of the population; 13% men, 13% women) showed a rapid escalation, rising to an average of over 1.5 episodes of binge drinking per 2-week period at ages 19–20 and 21–22, and then rapidly declining to an average of 0.3 episodes per 2-week period by ages 23–24. The Rare group (17% of the population; 16% men, 18% women) showed consistently low levels of binge drinking across the four waves, averaging 0.3 episodes per 2-week period. The “never” group is not illustrated in Figure 1.3. (It would be a flat line along the x axis.) This group represents 38% of the population (26% men, 46% women). Finally, 6% of the population (8% men, 5% women) did not fit into any of the groups.

The number and shape of trajectory groups did not vary by college

student status, but prevalence rates of some of the groups did. Significant differences were found for the Decreased group (7% vs. 12% for college and non-college youth, respectively), the Increased group (12% vs. 9%, respectively), and the Fling group (16% vs. 10%, respectively). Thus, college students are more likely to be “late starters,” with the Fling group being especially emblematic of college students. Within the college group, there are important differences according to sociodemographics and college experiences. In particular, considering age 19–20 living arrangements (home with parents, in fraternities/sororities, elsewhere), the Chronic, Increased, and Fling groups are most prevalent among fraternity/sorority students and least prevalent among those living with parents; the Never group is most prevalent among students living with parents and least prevalent among fraternity/sorority students. White students have lower rates of the Rare and Never trajectories, and higher rates of the other groups. There were no differences by historical cohort or size of university. Finally, those who eventually dropped out of college had higher rates in the Chronic and Decreased groups, and no differences in the other groups.

### **College Student Increased versus Fling versus Rare Groups: Predictors and Correlates**

The Increased, Fling, and Rare groups offer a natural experiment of sorts because of their initial identical low binge-drinking levels, allowing for the examination of characteristics and experiences that relate to subsequent divergence in trajectories. We consider three questions: (1) can the three groups be distinguished in advance according to age 18 demographic and psychosocial characteristics?; (2) at age 19–20, are there psychosocial differences among the three groups corresponding to the clear binge-drinking differences?; and (3) looking into the future at age 30, are there psychosocial differences among the three trajectory groups?

Numerous predictors and correlates were included in these analyses (for details on the various measures see Bachman et al., 1997; Jackson et al., 2008; McCabe et al., 2005; Schulenberg et al., 1996, 2005; Staff et al., 2010). We used logistic regression analyses to distinguish among the groups based on age 18 predictors, and we used analyses of variance (ANOVAs) to compare the three groups at ages 19–20 and 30.

In predicting trajectory group membership with age 18 measures, it was found that men, whites, those youth who scored higher on drinking to get drunk and evenings out with friends, and those lower on conventionality were more likely to be in the Increased group than in the Rare group; whites and those youth who were higher on evenings out with friends were more likely to be in the Fling group than in the Rare group;



and women were more likely to be in the Fling group than in the Rare group. Especially for the latter two comparisons, these are very short lists of significant predictors, thus highlighting the difficulty in prospectively predicting the divergences, and suggesting that the divergences have more to do with transitional experiences (and perhaps earlier and additional measures).

At ages 19–20 (wave 2), when differences in binge drinking are evident between the groups, there is an abundance of psychosocial differences as well. The Increased and Fling groups, compared to the Rare group, were higher on sensation seeking, risky driving, marijuana and other substance use, drinking to get drunk, evenings out with friends, and fraternity/sorority involvement; they were lower on social conservatism. In addition, the Increased group only (compared to Rare group) was higher on delinquency, social intolerance, proportion of friends who got drunk, and dating; they scored lower on religious importance. These numerous differences between the Increased/Fling groups and the Rare group emerged with the transition to college. Finally, the Increased group, compared to the Fling group, was higher on delinquency and marijuana use and lower on religious importance, suggesting some foreshadowing related to deviance and conventionality of the future divergence in binge drinking in these two groups.

Finally, in terms of psychosocial differences among the three groups at age 30, we found almost no differences in the long list of constructs between the Fling and Rare groups, with the only difference being that the Fling group was significantly higher on self-rated competence as a spouse and parent. Thus, despite their clear differences in binge drinking and psychosocial constructs during college, these two groups were indistinguishable by age 30. Comparing these two groups to the Increased group at age 30 yielded numerous differences: the Increased group was higher on binge drinking, substance use, sensation seeking, risky driving, drinking to get drunk, social intolerance, evenings out with friends, and proportion of friends who got drunk; they were less likely to be married and scored lower on religiosity. The Increased group looked, in relative terms, like they did at age 20. Thus, there appear to be few long-term consequences for the Fling group, yet clear consequences for the Increased group. That these two groups were not especially distinguishable at ages 18 and 19–20 suggests that the emerging and lasting differences had more to do with transitional than preexisting differences.

In relating these findings to what we discussed earlier about discontinuities in substance use, the Increased group reflects a turning point: they experienced a clear and lasting change in course that was difficult to predict in advance (compared to the Rare and Fling groups); that is, they appeared fine at age 18, then increased their binge drinking and related

problem behaviors through college, and ended up worse off at age 30. In contrast, the Fling group reflects a developmental disturbance: they experienced a time-limited deviance that was difficult to predict in advance (compared to the Rare and Increased groups) and did not result in future negative consequences (compared to the Rare group). But it would be a mistake to view the Fling group as a salutary trajectory. Although it was time-limited, college students in this group were heavily involved in alcohol use and related deviant activities that could cause themselves and others harm (see Hingson, Heeren, Winter, & Weschler, 2005; Perkins, 2002). Furthermore, recent preliminary evidence suggests male college students in the Fling group were at elevated risk for an alcohol use disorder at age 35 (compared to the Rare group). Finally, because we could not easily distinguish Fling from Increased drinkers at ages 18–20, there is no guarantee that an escalating trajectory of binge drinking is reversible rather than potentially problematic for poorer adult outcomes.

## SUMMARY AND IMPLICATIONS

As we have shown, college student substance use is best viewed as a moving target that changes both historically and developmentally. The swings in substance use can be dramatic—for example, prevalence rates of 12-month marijuana use for college students went from 53% in 1981 to 27% in 1991 (a 49% drop in 10 years); developmentally, binge drinking for college males climbs from an average of 0.75 episodes to 1.3 episodes per 2-week period between ages 18 and 21 (a 73% increase in 3 years). Thus, the appropriate frame for the problem of college student substance use includes the historical and developmental context.

### Historical Trends

The Monitoring the Future project has monitored historical trends in substance use for over a third of a century, providing the foundation for understanding causes of changes in substance use, and ultimately for reducing substance use (Johnston et al., 2010). For college students across the past three decades, rates of 30-day alcohol use have shown modest linear declines, and rates of illicit drug use (12-month marijuana and other illicit drug use) have shown wide cyclical trends with an overall decline. College student substance use today is not as prevalent as it has been in the past. Compared to historic highs in the last three decades, current rates of monthly alcohol use and annual marijuana and other illicit drug use are all lower. Nonetheless, there is clear room for improvement, and consistent with Johnston, O'Malley, and Bachman's (1995)

notion of generational forgetting, easing up on prevention efforts when rates are relatively low can result in subsequent increases.

Constant historical trends are unusual for substance use. Thus, the fact that binge drinking among college students has been nearly constant over the past three decades (hovering around 40%), when all other substances for all other subgroups have varied widely, suggests that powerful countervailing forces keep it locked in place. It would be a mistake to see college binge drinking as an intractable problem, but we must view it as a problem that is multiply determined. That this rate has dropped in the past two years (to 37% in 2009) allows for some optimism. Over the past three decades, compared to non-college youth, college students have been consistently higher in alcohol use (30-day and binge drinking), not consistently different in 12-month marijuana use, and consistently lower in 12-month use of other illicit drugs. The differences between college and non-college youth have generally been consistent (i.e., despite level differences, shapes of the historical trends have been consistent), suggesting that the historical variation is due to forces pertaining to all youth ages 19–22 rather than just to college youth.

### Developmental Trends

We show that attending a 4-year college full-time, compared to nonattendance, is related to lower levels of binge drinking and 30-day marijuana use in high school, faster rates of increase in both substances across ages 18 to 21, and then faster rates of decline across ages 21 to 25 such that by age 25, there is little difference in rates for the two groups. Those who eventually drop out of college have higher rates of binge drinking and 30-day marijuana use in high school, suggesting some selection effects; but their rates of increase between ages 18 and 21 (by the time they have dropped out) are actually *slower* than the rates of increase for those who stay in college (except for marijuana use for women), suggesting little relation between escalating substance use during the first few years of college and dropping out.

As we show, embedded within the total sample normative trajectory of binge drinking are several distinct trajectory groups including the Chronic, Decreased, Increased, Fling, Rare, and Never groups. The first two groups (12% of college population) represent the heavy drinkers that colleges “inherit,” and the third and fourth groups (38%) represent those who become heavy drinkers with the transition to college. It is instructive to compare the Increased, Fling, and Rare groups, given their common low level of drinking in the senior year of high school. In general, distinguishing the three based on senior-year psychosocial risk factors proved unsuccessful. But at ages 19–20, when most were first- and

second-year students, and when their binge drinking started to diverge, the Increased and Fling groups were found to be quite different from the Rare group on many of the same psychosocial risk factors. Then, at age 30, the Fling and Rare groups were found to be nearly indistinguishable, and both were found to be quite distinct from the Increased group, who were slower in taking on adult responsibilities. The Fling group, which represents a prototypical college student trajectory, can be viewed as the result of a developmental disturbance, a time-limited period of deviance that is neither predictable in advance nor predictive of future difficulties. The Increased group can be viewed as having experienced a negative turning point, a clear and long-term change in course that was not predictable in advance. Using this framework to view college student substance use is instructive, but the trajectory groups should be viewed as fluid and not preordained. Although it is tempting to be unconcerned about the Fling group, it is important to note that they are not easily distinguishable in advance from the Increased group who continue to experience problems in adulthood, underscoring the perils of venturing down the path of escalating substance use during the college years.

### **Prevention and Policy Implications**

Several implications follow from the perspective and findings offered in this chapter. First, the transition to college, like other major life transitions, represents a window of opportunity for intervening. Much is already in flux, so the purpose becomes to change something that is already changing, to redirect wayward trajectories. Second, to the extent that difficulties with the transition to college contribute to difficulties with substance use, easing the transition can yield reduced substance abuse (Schulenberg & Maggs, 2002). Third, recognizing that distinct trajectories are embedded within the normative trajectories of binge drinking and marijuana use is important when trying to reduce rates of use (e.g., working to turn Increased trajectories to Fling trajectories). Fourth, common risk factors may be less powerful in college than they are at other ages or in other contexts. The transition to college may be accompanied by substance use that seems to “come out of nowhere” in that those who develop difficulties (e.g., Increased and Fling groups) did not have the well-known risk factors in high school, thus making advanced identification more difficult.

Finally, it must be recognized that important developmental tasks can sometimes be accomplished through substance use (Schulenberg & Maggs, 2002). Indeed, adolescents and young adults typically report that a primary reason for drinking and using illicit drugs is to have a good time with their friends (Patrick & Schulenberg, 2011). According to Chas-

sin, Pitts, and DeLucia (1999), risk taking and even deviance can serve “constructive” as well as “destructive” functions in health and development. As Maggs (1997) demonstrates, alcohol use during the transition to college may help to achieve valued social goals, such as making new friends, although at the same time it may threaten safety and short- and long-term health and well-being. In addition, as we show, staying in college, rather than dropping out, is associated with a more rapid increase in binge drinking, suggesting that such drinking reflects college engagement. Thus, substance use may sometimes reflect success in, or help accomplish, various social and identity tasks; finding alternatives that are equally effective in accomplishing such tasks is an important goal for substance use prevention efforts with college students.

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